

round which they were generated, somewhat nearer to our doors.

There is yet one point on which, before quitting the subject, I may add a few words. Sir J. W. Lubbock, in the paper from which I have already quoted so much, has hinted at the possibility of some want of homogeneity in the constitution of the globe, so that in cooling, the position of the axis of rotation may have changed. The varying amount of subterranean heat and volcanic energy in the same region at different periods of the earth's existence has frequently been commented on, as has also the varying degree of subsidence or elevation in the same tract at different times. The forces, whatever they may be, to which these upward and downward movements are due, have, as Sir Charles Lyell has remarked, "shifted their points of chief development from one region to another, like the volcano and the earthquake, and are all, in fact, the results of the same internal operations to which heat, electricity, magnetism, and chemical affinity give rise."

Whether changes in the specific gravity of enormous masses of rock in consequence of their being heated would be of sufficient degree to disturb the equilibrium of the globe, is a difficult question; but the remarkable position of the magnetic poles of vorticity with regard to the actual poles of the earth, and the distribution of the magnetic force over the earth's surface may, as has been suggested to me by Capt. F. J. Evans, F.R.S., have some geological significance. These poles are in lat. 70° N., long. $96\frac{3}{4}^{\circ}$ W., and in lat. $73\frac{1}{2}^{\circ}$ S., long. $147\frac{1}{2}^{\circ}$ E. If we draw a circle around the globe, cutting these two points, we find that the magnetic poles, instead of being 180° apart, are only about 165° distant in one direction, while they are about 195° in the other. In like manner the magnetic equator, or line of no dip, differs considerably in position from the terrestrial equator, being drawn about 15° to the south over South America, and about 10° to the north over Africa, and in passing the great Asiatic continent. There is also this singular circumstance, which was insisted upon by Sir Edward Sabine nearly forty years ago—viz., that if the globe be divided into an eastern and a western hemisphere by a plane coinciding with the meridian of 100° and 280° , the western hemisphere, or that comprising the Americas and the Pacific Ocean, has a much higher magnetic intensity distributed generally over its surface, than the eastern hemisphere, containing Europe and Africa and the adjacent part of the Atlantic Ocean. The points of the greatest intensity of the magnetic force, moreover, do not correspond with the magnetic poles, as there are two such foci in the northern hemisphere (those of America and Siberia) making it probable that there are two also in the southern hemisphere.

Such facts would seem more in accordance with a want of uniformity in the inner constitution of the globe than with its being a body all the parts of which are arranged in perfect symmetry. Some abnormal features in the direction of gravity in different parts of the world seem also to afford corroborative evidence to the same effect. The subject is one of perhaps too theoretical a character for the geologist to approach; but if any definite connection could be established between terrestrial magnetism and the internal constitution of the globe, we might, possibly, be justified in drawing the inference from its phenomena, that there are forces in operation in the interior of the earth by which its equilibrium may have been disturbed, and its axis of revolution thus caused to change in position.

(To be continued.)

NOTES

THE Italian naturalist Beccari is again in New Guinea, exploring the north coast near Humboldt's Bay, along with an expedition sent out by the Governor-General of the Dutch Colonies. Of his former companion, D'Albertis, now at Yule Island, near the south-eastern extremity of New Guinea, we regret to hear that one of his collections from that district, containing about 35,000 insects and 700 reptiles, has been lost on its transit from Cape York. The bird-skins were, fortunately, not sent by the same vessel, and are therefore safe.

THE Paris Observatory has received for January last Meteorological observations made six times each day, at the Norma Schools, at the following thirty-four places:—Albertville, Alençon, Amiens, Aurillac, Avignon, Beauvais, Besançon, Bourg, Bourges, Caen, Carcassonne, Chalons, Chartres, Chaumont,

Clermont, Commercy, Dragnignan, Foix, Grenoble, Le Mans, Le Puy, Loches, Lons-le-Saulnier, Mâcon, Melun, Mirecourt, Nîmes, Orléans, Parthenay, Périgueux, Privas, Rouen, Troyes, and Villefranche. The importance of this valuable system of observation in its bearings on the peculiarly difficult problem of the meteorology of France, it would be difficult to over-estimate, especially when taken in connection with the numerous observers of thunder-storms and other phenomena requiring few or no instruments for their observation, whose services are being secured in different departments.

PROF. CANTONI has intimated to the Permanent Committee appointed by the Meteorological Congress of Vienna that the Italian Government has been pleased to intimate its readiness to invite the countries which were represented at Vienna to attend a Meteorological Congress in Italy in the autumn of 1877.

THE Permanent Committee of the Vienna Meteorological Congress have announced their intention to hold their next meeting in London, in Easter week, commencing April 18 next.

NINE Lectures on the Shoulder-Girdle and Fore Limb of Vertebrata, will be delivered in the Theatre of the Royal College of Surgeons, on Mondays, Wednesdays, and Fridays, at 4 P.M., commencing on Monday, March 6, 1876, by Professor W. K. Parker, F.R.S.—Lecture I. March 6. The Vertebrate Skeleton. II. March 8. Shoulder-girdle and Fore Limb of Fishes. III. March 10. Shoulder-girdle and Fore Limb of Fishes. IV. March 13. Shoulder-girdle, Fore Limb, and Sternum of Amphibia. V. March 15. Shoulder-girdle, Fore Limb, and Sternum of Reptiles. VI. March 17. Shoulder-girdle, Fore Limb, and Sternum of Birds. VII. March 20. Shoulder-girdle, Fore Limb, and Sternum of Mammals. VIII. March 22. Shoulder-girdle, Fore Limb, and Sternum of Mammals. IX. March 24. Summary and conclusion.

THE following is the business to be brought before the Half-Yearly General Meeting of the Scottish Meteorological Society to-day:—1, Report from the Council of the Society; 2, Report from the Ozone Committee; 3, The Salmon, Grilse, and Trout Fishings of the Tweed, in relation to Meteorology, by G. L. Paulin, Esq., and the Secretary; 4, Report from the Herring Committee.

THE following memoirs and reports of the United States Geological and Geographical Survey of the Territories, under the direction of Prof. Hayden, are now in the press, and will be issued during 1876:—1. Monograph of the Rodentia of North America, by Elliott Coues and J. A. Allen. Quarto, about 500 pages, with numerous illustrations. 2. Monograph of the Geometrid Moths, by Dr. A. S. Packard, jun. 350 pages quarto, with 13 plates. 3. The Fossil Invertebrata of the Western Territories, by J. B. Meek. 600 pages quarto, and 45 plates, with numerous woodcuts in text. 4. The Fossil Flora of the Lignitic group of the Western Territories, by Leo Lesquereux. 65 plates, quarto. 5. The Ethnography and Philology of the Hidatsa Indians (Minnetarees of the Upper Missouri). 400 pages, octavo. 6. Annual Reports of the Survey for 1874 and 1875. 7. Bulletin of the Survey for the year 1876; several important articles in press. Other works are in process of preparation, and may be printed before the close of the year.

THE *Bulletin* of the United States Geological and Geographical Survey of the Territories, Prof. Hayden in charge, has just issued Nos. 5 and 6, which close the year 1875. In No. 5, there are nine articles on various subjects of Geology and Natural History. In No. 6 there are four articles, with table of contents and complete index. It is suggested by Prof. Hayden that the two *Bulletins* of 1874 be bound with those of 1875, as Volume I. The index and title-page have been made with this idea in view. Volume I. will then comprise about 600 closely printed 8vo. pages, with 26 plates, sections, &c.

THE Cincinnati Observatory, since its reorganisation, under the charge of Mr. Ormond Stone, has again assumed a satisfactory position among kindred institutions in the United States. A School of Astronomy has been established, with quite a number of pupils. The double-star observations made by Prof. Mitchell have been reduced, and are ready for the printer. They embrace between 300 and 400 observations, made during the years 1846, 1847, and 1848. A series of double-star measurements has also been entered upon, restricted to those south of the equator, with a result of bringing to light quite a number of new close double stars.

THE first annual report of the Chicago Botanical Garden has been published. A plan has been prepared for the permanent arrangement of the entire ground. At the date of the report living specimens of ninety-five species of native plants had been placed in the garden, and seeds of 456 species collected in sufficient quantity for exchange.

WE understand that Dr. J. Gray McKendrick intends offering himself as a candidate for the chair of Physiology in Glasgow University, when Prof. A. Buchanan's intimated intention of resigning that chair has been carried into effect.

M. PAUL BERT has offered a prize for the best means of protecting the lives of aeronauts and mountain-climbers in circumstances where cold and rarefaction of the air become dangerous. The prize offered by M. Bert is a 20*l.* gold medal, and the competition is open up to December 31, 1876.

THE papers read on Monday evening at the Royal Geographical Society were, "On the Shweli Valley of Burmah," by Mr. Ney Elias; and "Afghan Geography," by Mr. C. R. Markham. The paper of Mr. Ney Elias described an alternative route into China to that which Mr. Margary had unfortunately taken, and been murdered. In introducing the second paper, on "Afghan Geography," Mr. Markham stated that its materials had been collected from the journals of the late General Lynch, compiled in Afghanistan. The paper gave full details of the history, geography, and antiquities of Afghanistan. General Lynch described the country through which he passed as being full of lovely valleys, inhabited by a gentle and hospitable people, as studded with mines of gold and silver and coal, as teeming with fertility, and as being rich in ancient monuments, in inscriptions, and in sculpture. A map of Afghanistan is being prepared in the War Office, embracing all the existing materials, and that map when published will show how many gaps in our geographical knowledge of Afghanistan still remain to be filled up.

THE *Bulletin* of the French Geographical Society contains a paper by M. V. A. Malte-Brun, giving an appreciative and sympathetic account of the organisation of the English Arctic Expedition and its progress up to the latest news received. M. Malte-Brun hopes to see the day when a French Expedition will set out for the North Pole. Abbé David's Second Voyage of Exploration in Western China, 1868-1870, is described, and M. J. Codine gives an account of the discovery of the African Coast from Cape St. Catherine to the Great Fish River by the Portuguese during the years 1484-1488.

ACCORDING to the *Annuaire* for 1876, there appear to be five English Academicians and twenty-nine English correspondents of the Institute of France. As Academicians in Science are Prof. Owen and Sir G. B. Airy; as Correspondents in the Class of Science are Professors Sylvester and Adams (Cambridge), Sir T. MacLear, Rear-Admiral Richards, General Sabine, Dr. J. P. Joule (Manchester), Dr. E. Frankland, Prof. A. W. Williamson, Prof. W. H. Miller (Cambridge), Dr. Hooker (Kew), Dr. W. B. Carpenter, Dr. Huggins, and Mr. Lockyer.

THE *Morgenblad* of Christiania states that a singular phenomenon was observed there after a recent violent storm. A

number of worms were found crawling on the snow, and it was impossible to find the places from which they had issued, everything being frozen in the vicinity. Similar circumstances were reported from several places of Norway.

M. CYBOULSKY, a mining proprietor in Siberia, is said to have given a sum of 100,000 roubles to help the Government to found the Tomsk University.

THE number of students registered in the Paris Faculty of Medicine this year is 6,500, the largest number yet reached. On February 22, the Municipal Council of Paris voted a sum of six millions of francs for the construction of new buildings round the old ones belonging to the Faculty. The property of the buildings now in existence has been given up by the State to the City of Paris on the express condition that they should always be devoted to the Faculty of Medicine.

MANY of our readers, we are sure, will rejoice to hear that a movement is on foot in Germany to abolish the crabbed printed German alphabet and adopt Roman type. We sincerely wish the movement may lead to the desired result, and that it will extend to the still more vexatious written alphabet.

A NEW scientific periodical entitled *Electricité* has been issued in Paris, under the patronage of Count Halley d'Arroz, director of the International Electrical Exhibition of 1877. It will be profusely illustrated, and will be used by the Commission of Organisation as one of its official organs.

THE Committee appointed by the Préfet de la Seine to superintend the construction of lightning conductors in Paris has been changed into a permanent one. A sum of 8,000*l.* has been appropriated by the Municipal Council for reconstructing all the lightning conductors in Paris, or at least all those which may be found defective or inefficient. This sum is a first instalment, as the whole of the work, it is supposed, will cost 50,000*l.*, although the Committee has not recommended the use of copper conductors. It is deeply to be regretted that the teachings of Sir Snow Harris are not better understood in France, as the Committee has adopted a number of excellent recommendations. Until the appointment of the Committee lightning conductors were constructed by ordinary blacksmiths, under the superintendence of architects who knew nothing of physics. A competitive adjudication took place on Feb. 19 between a number of competent electricians for the construction of all the lightning conductors on the Paris municipal monuments. The successful competitor is M. Grenet, the well-known electrician. A *cahier des charges* with seventy carefully-drawn provisions has been published. The electric continuity of conductors must be tested yearly, and the contractor will be paid by instalments, so that his claim will be cleared up only when the efficiency of his work shall have been tested during a certain number of years. The platinum cone has been abolished and replaced by a copper cone. The quality of the iron, as well as of the copper and solder, is to be tested by chemical analysis. The insulation of rods has been abolished as being useless. The Commission has diminished the diameter of protection area, which was supposed to be twice the height, and has reduced it to 1.45. The consequence is that rods are to be multiplied. The principal provisions of the 1876 *cahier des charges* have been drawn in accordance with the instructions published by the French Academy of Sciences in 1825.

WE have received a copy of the rules adopted at a recent meeting of the newly-formed Mineralogical Society of Great Britain and Ireland. The object of the Society is the study of mineralogy and petrology, and it will be composed of ordinary members, associates, and corresponding members. Besides general and annual meetings, local meetings may be held at any time and place as may be agreed upon by six members or associates. The Society will publish a journal. The President is

Mr. H. C. Sorby, F.R.S., the Secretary, Mr. R. P. Grey, F.G.S., and the Council is composed of men whose names are well-known in science.

THE head of the publishing firm of Didot, died a few days ago at the age of eighty-six. The deceased was a member of the Academy of Inscriptions, and under his direction the firm published a number of valuable scientific books. The Didot firm hold the office of printers to the French Institute, M. Gauthier Villars being only printer to the Academy of Science.

THE second annual meeting of the members of the Scientific Club was held at the Club House, Savile Row, on Thursday, the 17th Feb. Major F. Duncan, D.C.L., Chairman of the Committee, presided. The Report of the Committee, showing the rapid progress the Club had made during the past year, was unanimously adopted.

WE are asked to state that supplemental meetings for the reading and discussion of papers by students of the Institution of Civil Engineers have been appointed for the following Friday evenings:—February 25, March 3, 10, 17, 24, and 31. The chair will be taken at 7 o'clock on each evening, and successively by Dr. Pole, F.R.S., Sir W. G. Armstrong, C.B., F.R.S., Mr. H. Hayter, Mr. Woods, Mr. Brunlees, and Mr. Berkley, Members of Council.

AMONG the papers in the published "Proceedings" of the Belfast Natural History and Philosophical Society for 1874-75 are the following:—Presidential Address on atoms and automata, by Joseph J. Murphy, F.G.S.; On some Irish Palaeozoic fossils, by Rev. John Grainger, D.D.; On the water-bearing strata between Moira and Lurgan, by Robert Young, C.E.; On the geographical distribution of mammals, by R. O. Cunningham, M.D., Professor of Natural History, Queen's College, Belfast; A suggestion on chemical notation, by the president, Joseph John Murphy, F.G.S.; Further notes on some of the swimming birds frequenting Belfast Lough, with special reference to the Great Northern Diver, by R. Lloyd Patterson.

THE additions to the Zoological Society's Gardens during the past week include a Virginian Eagle Owl (*Bubo virginianus*) from N. America, presented by Mr. H. Knight; two Widgeons (*Mareca penelope*), a Common Wild Duck (*Anas boschas*), a Lesser Black-backed Gull (*Larus fuscus*), three Herring Gulls (*Larus argentatus*), two Common Gulls (*Larus canus*), three Black-headed Gulls (*Larus ridibundus*), European, presented by Mr. C. Clifton; a Common Otter (*Lutra vulgaris*), European, received in exchange; a Darwin's Pucras (*Pucrasia darwini*) from China, a Rose-crested Cockatoo (*Cacatua moluccensis*) from Moluccas, deposited; a Zebu (*Bos indicus*) born in the Gardens.

SCIENTIFIC SERIALS

THE *American Naturalist* has changed its form this year. In future it is to be published by Messrs. H. O. Houghton and Co., Cambridge, Mass., under the editorship of Dr. A. S. Packard, jun. The amount of matter is increased, and the articles will be of a more popular nature than previously. A department of Geography and Travel is added, and Dr. R. H. Ward, of Troy, N.Y., will superintend the Microscopy. There seems to be considerable difficulty in the production of a science journal in America, and we think that there is still room for improvement. The first paper in the January number is on "Burs in the Borage family," by Prof. Asa Gray, in which a new form, named *Harpagonella*, is described, having been obtained by Dr. E. Palmer, from Guadalupe Island, off Lower California.—The Rev. S. Lockwood describes the habits of the "Florida Chameleon" (*Anolis principalis*).—Mr. David Scott writes on the proper specific name of the Song Sparrow, *Melospiza fasciata* (Gondin), not *M. melodia* (Wilson).—Mr. J. C. Russell shows of what great value the New Zealand Flax (*Phormium tenax*) would be if a method of cleaning it could be discovered.—Mr. J. A. Allen discusses the availability of certain Bartramian names in ornith-

ology, and opposing Dr. Coues' desire to establish some of them. A list is given of those of Bartram's names which Dr. Coues wishes to re-establish.—Prof. N. S. Shaler describes the first session of the Harvard Summer School of Geology.—Ancient ruins in S.W. Colorado are illustrated and described from photographs taken by Mr. W. H. Jackson, the photographer to Prof. Hayden's United States Geological Survey of the Territories, including a house, a round tower, and a square one of Indian construction.—Reviews of Sach's "Botany" (English translation) and Caton's "Summer in Norway," with badly-engraved drawings, are given, together with notes, &c., which conclude the number.

Poggendorff's Annalen der Physik und Chemie, No. 11, 1875.—The tuning-fork has become an important instrument in physical observations, and this number of the *Annalen* begins with a description of experiments by Dr. Etingshausen, with a stroboscopic tuning-fork apparatus, in which the motion of an electromagnetically excited fork is observed through slits arranged in connection with another fork of nearly the same pitch placed near it. The following are some of his results:—Compared with pendulum motion, that of tuning-forks is somewhat retarded in the inward course, and accelerated in the outward. The vibration time considerably increases with increase of the time of closure of the circuit. The electro-magnetically excited fork vibrates (where the divergences are not too great) more quickly than if the vibrations were caused by elasticity alone. With equal amplitude the duration of vibrations increases slightly with the time the apparatus has been in action; and it decreases with increasing density of the surrounding air.—Electric phenomena occupy a large share of attention in this number, especially various actions of the spark. M. Peters, extending the researches begun by M. Antolik on "gliding" electric sparks, describes effects obtained by letting the spark glide on smoked paper brought near the machine on a glass table. The trace of the flash showed three different parts, each about a third of the whole length. In the *positive third* were numerous branchings outwards from a middle part, which consisted of a succession of parallel dark and bright strips (the darkest in the middle); the *negative third* showed no branchings, and the parallel strips were in reverse order; the *middle third* was distinguished by a greater width and brightness. M. Peters seeks to account for these phenomena. In another note he points out some differences between spark-forms from large inductors and those from the Holtz machine.—A paper by MM. Mach and Wosyka, also suggested by Antolik's experiments, furnishes reason for thinking that the soot figures produced are due to air motions, and especially sound motions.—Again, M. Riess gives an account of the phenomenon of weak electric sparks (as he called them), which differ from the ordinary strong sparks in form, light, sound, and other properties. A mode of producing them was formerly described. He observes that the greater length of the negative electrode has no essential connection with their production, and that, in regard not only to length, but to light and sound, they are independent of the composition of the circuit in which they occur.—Some striking new light phenomena of electricity are also described by M. Holtz.—In a note on the dielectric constants of liquids, M. Silow furnishes experimental proof of a proposition of Helmholtz with regard to attraction of two electric masses situated in an insulating medium, and a valuable paper by M. Herwig treats of the magnetisability of cylindrical iron pipes in different directions; he considers that in addition to the forces hitherto taken into account, there are further molecular magnetic forces which are of the greatest importance. These act within a magnetic line in the direction of the entire magnetisation, and in interrupted portions of a magnetic line in the contrary direction.—MM. Hildebrand and Norton endeavour to fill up some gaps in our knowledge of the properties of metallic cerium, lanthanum, and didymium; having obtained these elements by the help of the electric current, according to Bunsen's method, in quantities of nearly fifty grammes.—A note on impact machines is contributed by M. Sedlacek.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, Feb. 18.—Annual General Meeting.—John Evans, F.R.S. president, in the chair.—The Secretary read the reports of the Council and of the Library and Museum Committee for the year 1875. The position of the Society was